

REMARKS

Reconsideration and allowance of the above-identified Application in view of the foregoing amendments and following remarks is respectfully requested.

Claims 1, 3-4, 6-7, 9, 12-24, and 26-28 are pending in the Application. Claims 2, 5, 8, 10-11 and 25 have been canceled herein without prejudice or disclaimer. Claims 3, 4, 9 and 12-24 have been withdrawn from consideration. Claims 26-28 are newly presented.

Specification

Applicant has made a diligent effort to review and correct any minor error in the specification. Applicant, however, respectfully requests the Examiner to point out any error that he may become aware of.

Objections

The disclosure is objected to because the description relating to the operation of the prism 15 is unclear with those shown in Figures 16A and 16B. Accordingly, Applicant has amended the paragraph stating at line 2 in page 24 of the specification and clarified the description of function of prism 15 to bring it into conformity with the original drawings. No new matter has been added.

Examiner's Suggestions

The Examiner suggests corrections to claims 5 and 25. Claims 5 and 25 have been canceled without prejudice or disclaimer.

Claim Rejections – 35 U.S.C. § 112

Claims 8 and 10 have been rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification. Claims 8 and 10 have been canceled without prejudice or disclaimer. Therefore, the rejection of claims 8 and 10 under § 112, first paragraph is rendered moot.

Consequently, Applicant respectfully submits that all the pending claims are in full compliance with 35 USC § 112.

Claim Rejections – 35 U.S.C. § 102

Claims 1, 2, 6 and 11 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Otaki (Japanese reference No. 11-218679). Applicant respectfully traverses this rejection for at least the following reasons.

Claims 2 and 11 have been canceled without prejudice or disclaimer. Therefore the rejection of claims 2 and 11 under § 102(b) is rendered moot.

Claim 1 has been amended to recite “wherein at least one of the first polarizing member and the second polarizing member is configured so that a distance therefrom to the position of localized fringes is variable by having a first tilt attitude, at the first position or the second position, in reference to an optical axis of the first objective lens or of the second objective lens, and a second tilt attitude, at the first position or the second position, in reference to the optical axis of the first objective lens or of the second objective lens.”

When replacing, i.e., interchanging, the first objective lens and the second objective lens a shift of the back focal position occurs. In order to compensate for the shift of the back focal position, the first polarizing member or the second polarizing member changes its tilt while the position of the first or the second polarizing member along the optical axis, i.e. first position or second position, remains unchanged. Attached herewith, as exhibit A, are schematic illustrations of a filter unit A having a filter 1 arranged with no tilt in a filter cassette inserted in an outer case of a microscope and a filter unit B having a filter 2 arranged with a predetermined tilt in a filter cassette with substantially the same dimensions as the filter unit A. The filter unit A and the filter unit B are interchangeable within the outer case of the microscope. Thus, the position of the filter 1 and the position of filter 2 remains unchanged along the optical axis.

In contrast, Otaki fails to disclose, teach or suggest that the polarizing member changes its tilt attitude while its position along the optical axis, i.e., first position or second position, remains unchanged. Attached herewith, as exhibit B, is an English translation of the relevant portion of the description of Figure 6 of Otaki.

Not claimed
←

Therefore, Applicant respectfully submits that claim 1, and claim 6 which is directly dependent from claim 1 are patentable and respectfully requests that the rejection of claims 1 and 6 under § 103(a) be withdrawn.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 2, 6 and 11 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Hayashi (U.S. Patent No. 4,964,707) in view of Otaki (Japanese reference No. 11-218679). Applicant respectfully traverses this rejection for at least the following reasons.

Claims 2 and 11 have been canceled without prejudice or disclaimer. Therefore the rejection of claims 2 and 11 under § 103(a) is rendered moot.

As recited in claim 1, at least one of the first polarizing member and the second polarizing member is configured so that a distance therefrom to the position of localized fringes is variable by having a first tilt attitude, at the first position or the second position, in reference to an optical axis of the first objective lens or of the second objective lens, and a second tilt attitude, at the first position or the second position, in reference to the optical axis of the first objective lens or of the second objective lens.” Therefore, in order to compensate for shift of the back focal position caused by replacement of the objective lenses, the first polarizing member or the second polarizing member changes its tilt, while its position along the optical axis (i.e., first position or second position) remains unchanged. As a result, the distance from the polarizing member to the position of localized fringes is varied.

In contrast, Hayashi merely discloses that the tilt is changed for improving image quality. Hayashi fails to disclose that the polarizing member changes its tilt attitude in accordance with a change of the back focal position caused by replacement of objective lenses while its position along the optical axis (first position or second position) remains unchanged.

As stated above, Otaki fails to disclose, teach or suggest that the polarizing member changes its tilt attitude while its position along the optical axis, i.e., first position or second position, remains unchanged. Consequently, neither Hayashi nor Otaki, alone or in combination, disclose, teach or suggest the subject matter recited in claim 1.

Therefore, Applicant respectfully submits that claim 1, and claim 6 which is directly dependent from claim 1 are patentable and respectfully requests that the rejection of claims 1 and 6 under § 103(a) be withdrawn.

New claims 26-28 read on the elected species of Figures 12A-12B. Support for the claim language may be found throughout the initial disclosure.

Claim 26 recites, *inter-alia*, “a second polarizing member disposed at a first position, which is located on an image side of the first objective lens and the second objective lens, to combine the two linearly polarized components on an identical path after passing through the first objective lens or the second objective lens, and possessing a position of localized fringes at

which the two linearly polarized components intersect with each other, the second polarizing member being configured so that a distance therefrom to the position of localized fringes is variable by having a first tilt attitude, at the first position, in reference to an optical axis of the first objective lens and a second tilt attitude, at the first position, in reference to an optical axis of the second objective lens.”

Neither Hayashi nor Otaki, alone or in combination, disclose, teach or suggest the first polarizing member or the second polarizing member changes its tilt while its position along the optical axis, i.e., first position or second position, remains unchanged in reference to an optical axis.

Therefore, Applicant respectfully submits that claim 26 and claims 27 and 28 are patentable.

CONCLUSION

In view of the foregoing, the claims are now in form for allowance, and such action is hereby solicited. If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, he is kindly requested to contact the undersigned at the telephone number listed below.

All objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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EXHIBIT A -

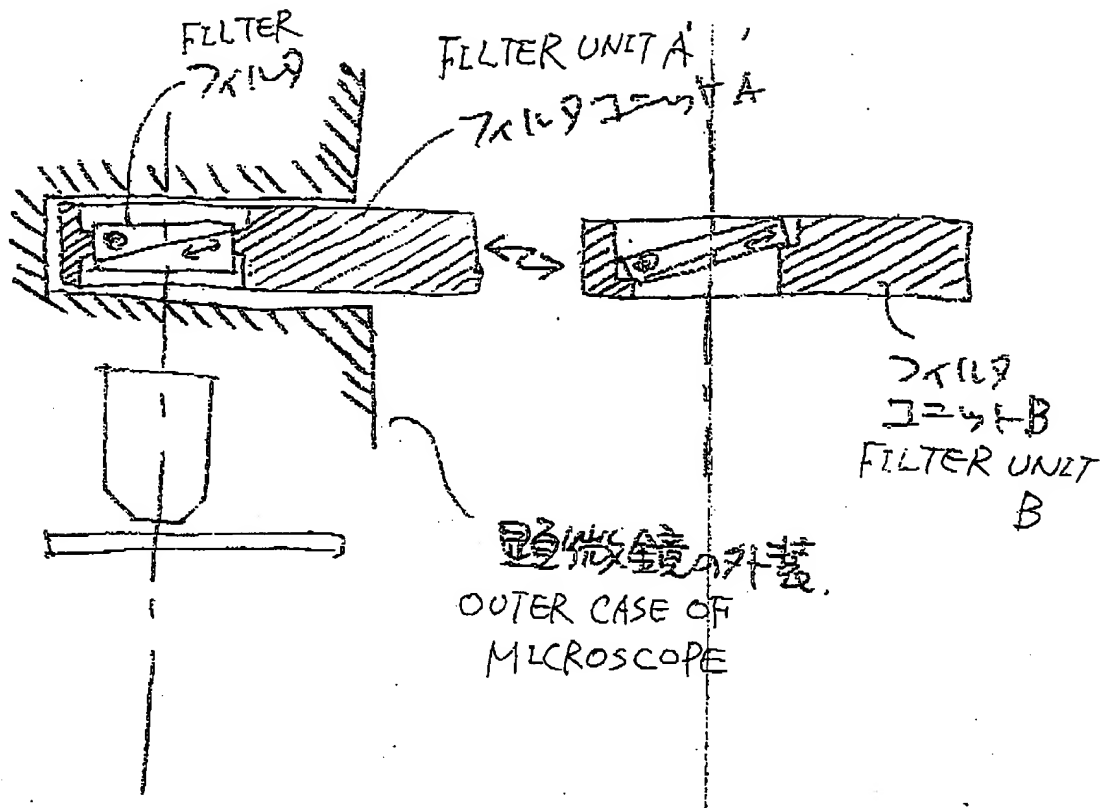


EXHIBIT - B -



Japanese Patent Application Preliminary Publication No. Hei 11-218679

Publication Date: August 10, 1999
Title of Invention: Differential Interference Microscope
Application No.: Hei 10-36663
Application Date: February 2, 1998
Applicant: Nikon Corporation
Inventor: ONTAKI, Kumiko

--- translation of the paragraphs [0023]-[0026] (in pages 5-6) ---

[0023] FIG. 6 shows a schematic sectional view of the transmission-type differential interference microscope according to the second embodiment of the present invention. After collected by the collector lens 2, illumination light from the light source 1 is incident on the polarizer P, to be converted into linearly polarized light. In the path of light between the polarizer P and the sample 4, an illumination-side prism B2, which is constructed of a Nomarski prism, and a condenser lens 6 that illuminates the sample 4 are arranged in order from the side of the light source 1. The linearly polarized light is incident on the illumination-side prism B2, to be separated into two linearly polarized rays having vibration directions perpendicular to each other. These two rays, as separated in this way, travel with a small separation angle after passing the illumination-side prism 2B, and are made to be slightly spaced parallel rays by light condensing function of the condenser lens 6, to illuminate the sample 4. The transmitted rays traversing two slightly separated positions on the sample 4 are converged on the ray separation plane Q of the imaging-side prism B1 constructed of a Nomarski prism by light converging function of the objective lens 3. The two rays are combined together by birefringent function of the imaging-side prism B1.

to travel on the identical path. Then, the combined light is incident on the analyzer A and only components having the same vibration directions are analyzed out of the linearly polarized light having perpendicular directions, to cause interference. Consequently, interference fringes in accordance with the phase difference between the two rays that is given as these rays have traversed the slightly different positions on the sample 4 are observed as a magnified image 5 on the image surface.

[0024] In this embodiment also, the imaging-side prism B1 is configured to change the tilt angle θ formed by the optical axis a and the normal n to the surface of the imaging-side prism B1 so that the intersection of the ray separation surface Q with the optical axis a coincides with the back focus of the objective lens 3. It is noted that the intersection of the ray separation surface Q' of the illumination-side prism B2 with the optical axis a is arranged to coincide with the front focus F' of the condenser lens 6 so that the two rays emergent from the illumination-side prism B2 as separated are converted into parallel rays by the light condensing function of the condenser lens 6 and illuminate the sample 4.

[0025] However, according to the second embodiment, since two prisms, specifically, the illumination-side prism B2 and the imaging-side prism B2, are used, it is necessary to make coincidence on the illumination side and the imaging side regarding the differential interference shear on the sample 4 (separation distance of the separated two rays on the surface of the sample 4). The imaging-side shear S on the surface of the sample 4 is given by:

$$S = f \cdot \tan \alpha$$

where the focal length of the objective lens 3 is represented by f . In the case where the tilt angle θ of the imaging-side prism B1 is changed, as in this embodiment, in accordance with the objective lens having different focal lengths, the ray separation angle α is scarcely changed even if the tilt angle θ of the prism is changed. Therefore, the shear S varies in proportion to the focal length f of the objective lens 3.

[0026] On the other hand, the illumination-side shear S' is determined by the focal length f' of the condenser lens 6 and the ray separation angle α' of the illumination-side prism B2, specifically, given by:

$$S' = f' \cdot \tan \alpha'$$

Therefore, since the focal length f' of the condenser lens 6 is constant, in configuring the illumination-side prism B2 so that $S=S'$ is satisfied in accordance with a change of the imaging-side shear S , it is only necessary to arrange the illumination-side prism B2 that has a ray separation angle satisfying the following condition:

$$\tan \alpha' = f \cdot \tan \alpha / f'$$